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RICERCHE ZOOLOGICHE DELLA NAVE OCEANOGRAFICA « MINERVA » (C.N.R.) SULLE ISOLE CIRCUMSARDE. XI

LAOPHONTIDAE FROM THE MEIOBENTHOS OF SOME CIRCUMSARDINIAN ISLETS: *ECHINOLAOPHONTE ARMIGER TYPICA* AND *ECHINOLAOPHONTE MINUTA* N.SP. (CRUST., COPEP., HARPACT.)

During some zoological expeditions around the small circumsardinian islands, carryed out by use of the C.N.R. ship « Minerva », samples of meiobenthos both from litoral waters and interstitial environment of beaches were collected. Among the material sampled in Spargi islet (La Maddalena archipelago) in Li Nibani 2 islet (North-eastern Sardinia) and in dei Cavoli islet (South-eastern Sardinia) (Baccetti et al., 1989), two species of *Echinolaophonte* Nicholls, 1941, subject of this paper, were found.

Laophontidae Scott
Laophontinae Lang

Echinolaophonte armiger typica Lang, 1965

Material - Two males collected in dei Cavoli islet (V. Cottarelli Leg., 30-VII-1986); twelve specimens (four males and eight females, five ovigerous) collected in Spargi islet (R. Argano and V. Cottarelli Leg., 6-IX-1987).

The material was obtained by washing stones and seaweeds collected at about 2-3- m in depth.

In Italy, *E. armiger typica* was already been found in the following localities: Genoa Gulf (Brian, 1921), Neaples (Douwe, 1929) and Sorrento Gulf (Pesta, 1959). The morphological features of the specimens studied by us well agrees with the observations made by Lang, 1965.

Echinolaophonte minuta n. sp.

Material - Nineteen specimens (eight males, eleven females, one ovigerous) collected on the beach of Li Nibani 2 islet (V. Cottarelli Leg., 11-IX-1987).

Types - Holotype: one female, mounted on a slide labelled *Echinolaophonte minuta* ht.

Paratypes - The remaining specimens, also mounted on slides, labelled *E. minuta* pt., and numbered from two to nineteen. The holotype and six paratypes (three males and three females) are part of the collection of Museo Civico di Storia Naturale, Genova; the remaining paratypes are temporally conserved in the Senior author's collection at the B.A.U. Dept. of « La Sapienza » University.

Diagnosis - An *Echinolaophonte* characterized, among other things, by the arrangement of the following features: morphology of rostrum and that of the dorsal process of cephalotorax, chaetotaxie of P2-P4, baseoendopodite of P5 (♀) bearing two inner setae.

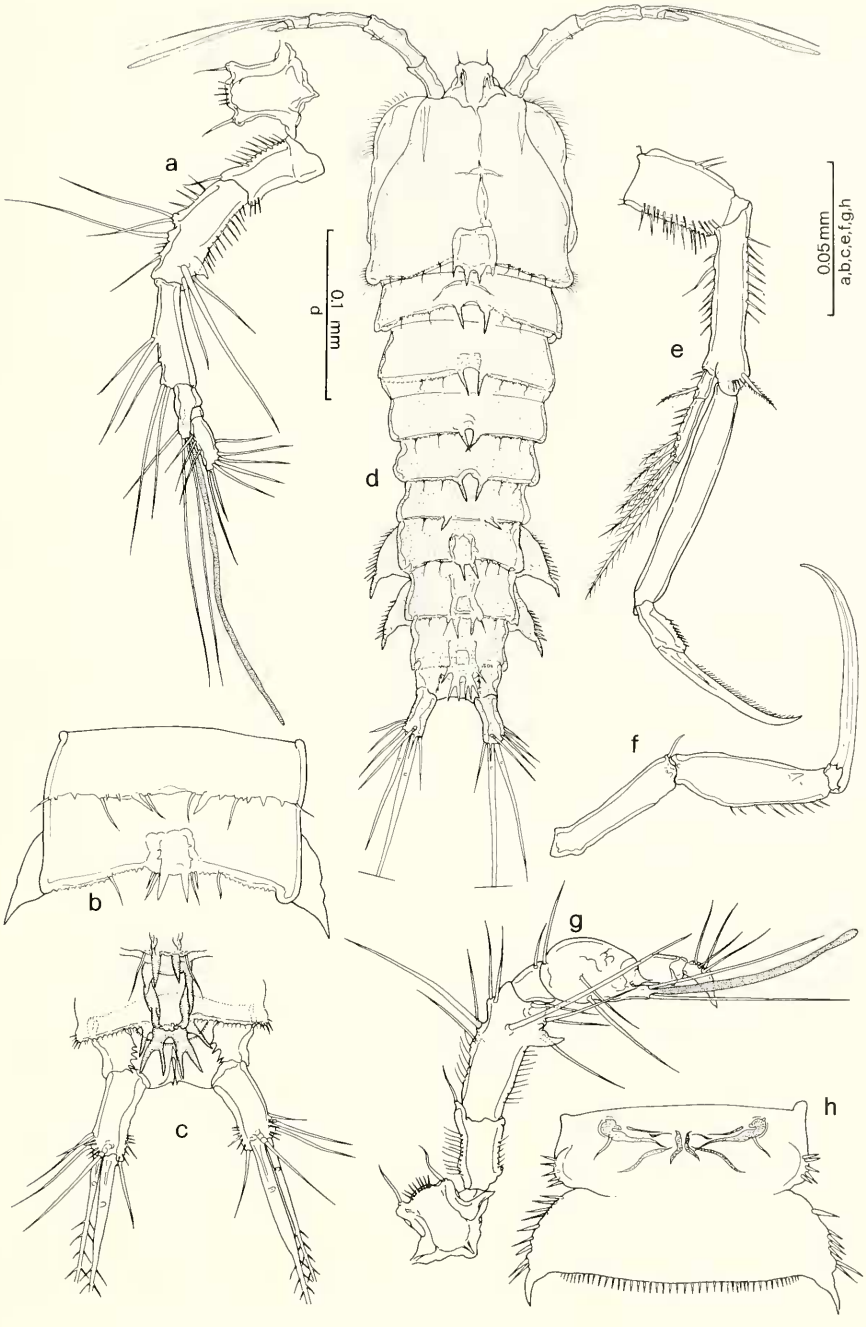
Description of the holotype - Habitus (Fig. 1,d): body slightly tapering towards the distal end. Length, from apex of rostrum to distal margin of anal operculum, 0,37 mm. Without pigment and photoreceptors.

Rostrum: short, not exceeding the length of the first segment of the first antenna, approximately square, its distal margin with a row of little setae situated between two longer sensorial setae.

Cephalotorax: a little longer than the following three somites: its dorsal surface distally bearing, on median line, a chitinous process nearly quadrangular, the posterior margin of which is provided with strong spines and many thin setae lined on dorsal surface and along margins.

Dorsal ornamentation of somites represented by two strong spiniform processes arranged along the median line, on the distal margin, that is denticulate.

Fig. 1 - E. minuta n. sp.. Female holotype: Figs. a,b,c,d,e,f,h. Male paratype: Fig. g. a - first antenna; b - first and second abdominal somites, dorsal; c - furcal rami and anal operculum; d - habitus; e - P1; f - maxilliped; g - first antenna; h - first and second abdominal somites, ventral. ▶


a
0.1 mm
d
d
e
0.05 mm
a,b,c,e,f,g,h
f
b
g
c
h

Penultimate abdominal somite with two strong bidentate projections accompanied outside by one spiniform projection. First and second abdominal somites dorsally distinguishable, ventrally partially melted (Figs. 1b, 1h), angularly produced laterally, with a set of marginal setae. Genital field (Fig. 3,a).

Anal somite approximately as long as the preceding one.

Anal operculum (Fig. 1,c): difficult to observe, as hidden by ornamentation of penultimate abdominal somite. Distal margin convex, bearing a row of thin setae.

Furcal rami (Fig. 1,c): nearly cylindrical, as long as the anal somite, about three times as long as wide, with three apical setae, the central one is the biggest, one dorsal seta articulate at the base, and three subapical outer setae. Remaining ornamentation as shown in figure.

First antenna (Fig. 1,a): six-segmented (base-segment excluded). Second segment is the longest, with proximal pointed apophisis near the inner margin. Fifth segment is the shortest, fourth one extending in outer prolungation bearing an aesthetasc accompanied by two long setae. Remaining ornamentation as shown in figure.

Second antenna (Fig. 3,g): allobasis nearly two times and a half as long as wide, with a continuous series of setae on inner lateral margin. Expodite one-segmented, with four pennate apical setae and a series of little setae on lateral margins. Endopodite as long as allobasis, bearing five distal spines, two of which geniculate, two subapical spines followed by a row of little setae on inner margin, three short spines on distal part of outer margin; a seta with a spinulose and club-like apex is inserted on dorsal surface.

Mandible (Fig. 3,d): palpum one-segmented, with four distal setae.

First maxilla (Fig. 3,c): arthrite of praecoxa with two strong apical spines accompanied by four spinules, coxa and basis each bearing one apical seta, endopodite represented by a tubercle bearing two apical setae; exopodite one-segmented, with one apical seta.

Second maxilla (Fig. 3,h): syncoxa with a series of spinules on inner margin; two endites, respectively with three and two apical setae. Basis shaped in a long, pointed claw thining at distal end, with one outer proximal seta. Endopodite represented by a reduced segment with two setae.

Maxilliped (Fig. 1,f): basis slender and a little bit shorter than the first segment of endopodite, with a small seta near the outer distal edge. First endopodite-segment without ornamentation. Second segment very short, bearing a strong claw, curved on apex, and longer than the first endopodite-segment.

P1 (Fig. 1,e): coxa a little bit longer than wide, with a double series of setae near the outer lateral margin; inner margin with two setae at about half length. Basis about two times as long as coxa, with setae lined along lateral margins, a pennate seta and some spinules inserted near inner distal edge. Exopodite two-segmented. First segment bearing a pennate seta and two spinules on outer lateral margin; second segment about two times and a half as long as the first one, bearing two long pennate apical setae and three outer pennate subapical setae accompanied by some spinules.

Endopodite two-segmented. First segment a little longer than basis, about eight times as long as wide; second segment 1/4 as long as the first one, with a series of spinules on inner lateral margin and bearing a strong and pointed distal claw.

P2-P4: basis with a long seta issuing from a small projection. This seta is plumose in P2. Exopodite three-segmented, with a row of small setae lined along outer margin; first and second segments each bearing a spine near outer distal edge. Endopodite two-segmented, with a row of little setae along lateral margins. P3 is the strongest.

P2 (Fig. 2,a): second segment of exopodite a bit shorter than the first one; third segment, more slender, is the longest, with two outer subapical spines and two long pennate apical setae. Length of endopodite a little exceeding the one of the former two segments of corresponding exopodite. Second segment a bit shorter and narrower than first one, with two long pennate apical setae and one outer subapical seta.

P3 (Fig. 2,b): second segment of exopodite is the shortest, bearing one thin seta a little beyond 1/2 length of inner margin. First and third segments nearly with the same length. Third segment bearing three spines along outer margin and two long pennate apical setae. Length of endopodite not exceeding the one of the former two segments of corresponding exopodite. Second segment two times as long as the first one, with two long pennate apical and two inner subapical setae.

P4 (Fig. 2,c): second and third segments of exopodite with the same length, less than 1/3 as long as the length of the first segment. Second

segment with a distal pennate seta on inner margin. Last segment bearing two spines on outer margin and two long apical pennate setae. Endopodite as long as 2/3 of the length of first segment of corresponding exopodite. First segment very short; second segment three times as long as the first one, with two long pennate apical setae.

P5 (Fig. 3,e): baseoendopodite with a outer pennate seta and two setae on inner expansion; margins and surface bearing very little setae. Exopodite narrow and stretched, with three pennate apical setae; surface with small setae. Remaining ornamentation as shown in figure.

Description of the male - Habitus, ornamentation of cephalotorax and that of somites, furcal rami, second antenna, oral appendices and P1 similar to female's ones. Length, from apex of rostrum to distal margin of anal operculum: 0,34 mm. Former two abdominal somites not angularly produced laterally (Fig. 3,f).

First antenna (Fig. 1,g) seven-segmented. Second segment is the longest, bearing the same apophisis signaled in the female, but that seems to be stronger. Sixth segment is the shortest, the fourth one considerably enlarged, bearing a long aestethasc issuing from a tubercle. Remaining ornamentation as shown in figure.

P2-P4: basis ornamentation as in female. Exopodite three-segmented, with little setae lined along outer margin; first and second segment with a spine near outer distal edge. Endopodites of P2 and P4 two-segmented, endopodite of P3 three-segmented. Small setae lined along both lateral margins on endopodite P2, only along outer margin on endopodite P3 and P4. P3 is the strongest.

P2 Fig. 2,d): doesn't differ from corresponding female's leg. It just seems to be longer and stronger.

P3 Fig. 2,f): stronger than the female's one. First segment of exopodite is the longest, with two short setae at about half length of inner margin; second segment bearing a short seta near inner margin, a little behind its half length. Third segment nearly as long as the second one, with a spine at half length of outer margin, another spine on outer distal edge, two spinulose apical setae, the outer one longer, and one inner subapical seta, easily distinguishable because it is not spinulose and its apex is « S » shaped. Endopodite three-segmented, shorter than the total length of the former two segments of corresponding exopodite. Second segment a little longer than the first one,

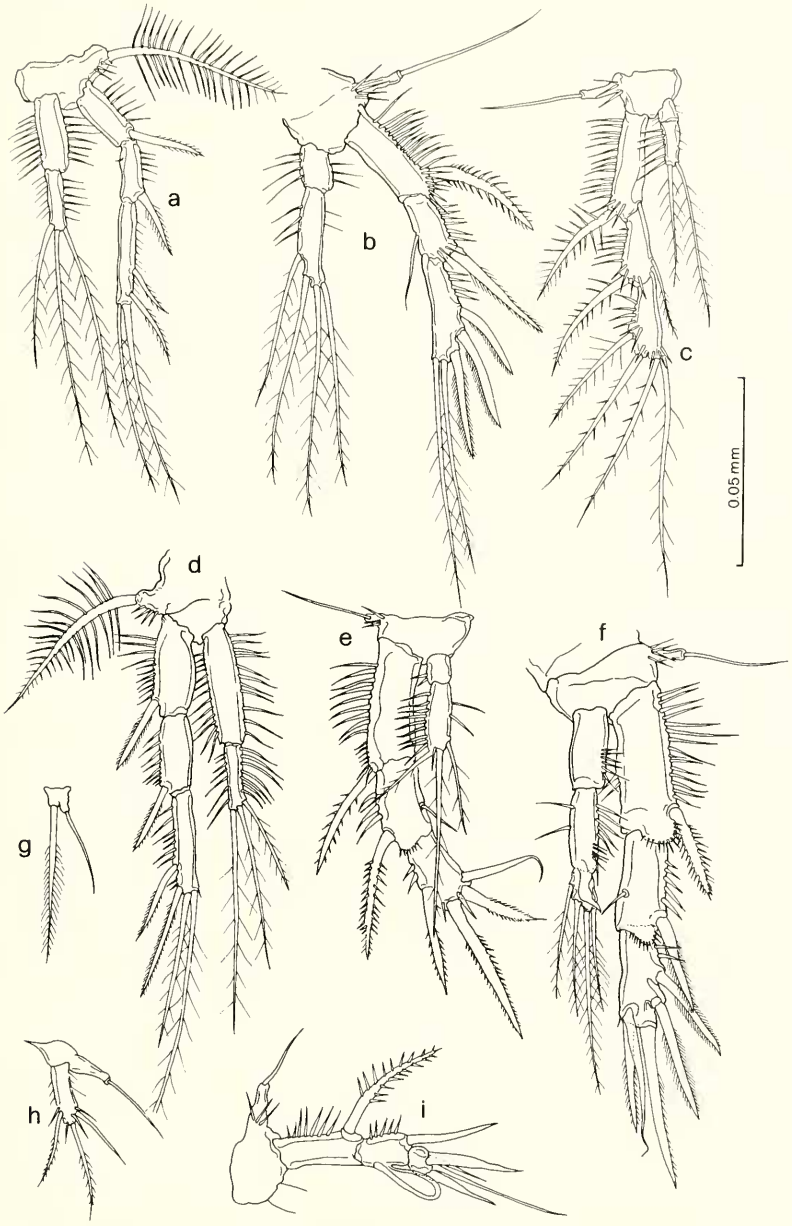


Fig. 2 - *E. minuta* n. sp.. Female holotype: Figs. a,b,c. Male paratype: Figs. d,e,f,g,h. Female paratype: Fig. i.
a - P2; b - P3; c - P4; d - P2; e - P4; f - P3; g - P6; h - P5; i - endopodite P3, aberrant.

with two short setae on inner margin, extending in a strong apophisis bending nearly at a right angle outward. Third article very short, 1/2 as long as the second one, with two long, pennate apical setae and two inner subapical ones.

P4 (Fig. 2,e): on the whole, stronger than in female.

Second segment of exopodite a little shorter than the first one, bearing a seta a little behind half length of inner margin. Third segment a little shorter than the second one, with a spine on outer distal margin, two spinulose apical setae, the outer is the longest, and an inner subapical seta, not spinulose and with curved apex. Endopodite: its length is inferior to that of the first segment of corresponding exopodite. First segment about 1/3 as long as the second one; second segment with two setae along the inner margin, two pennate setae and one inner subapical seta.

P5 (Fig. 2,h): extremely reduced, with the usual outer seta. Exopodite small and stretched, nearly rectangular, with a long pennate apical seta and two subapical setae. Remaining ornamentation as shown in figure.

P6 (Fig. 2g): reduced to a small lamina bearing two setae.

D e r i v a t i o n o m i n i s - The latine adjective « minuta » refers to the small body size of the new species.

V a r i a b i l i t y - A part from the usual variations in the total length, in some paratypes the two strong projections on penultimate somite are tridentate instead of bidentate.

Furthermore, in a female paratype, P3 shows an evident aberrant endopodite (Fig. 2i). All remaining features are constant in the type-series.

R e m a r k s o n t h e s a m p l e s i t e - *E. minuta* n. sp. has been collected using Charaman-Chappuis method. The beach is characterized by medium-coarse sand with rich organic detritus. The species seems to be exclusively present on seashore interstitial environment; actually, it has not been found in samples obtained by washing stones and seaweeds, collected in the stretch of sea overlooking the beach. It is interesting to note that the new species is the first interstitial *Echinolaophonte* known from the Mediterranean Sea.

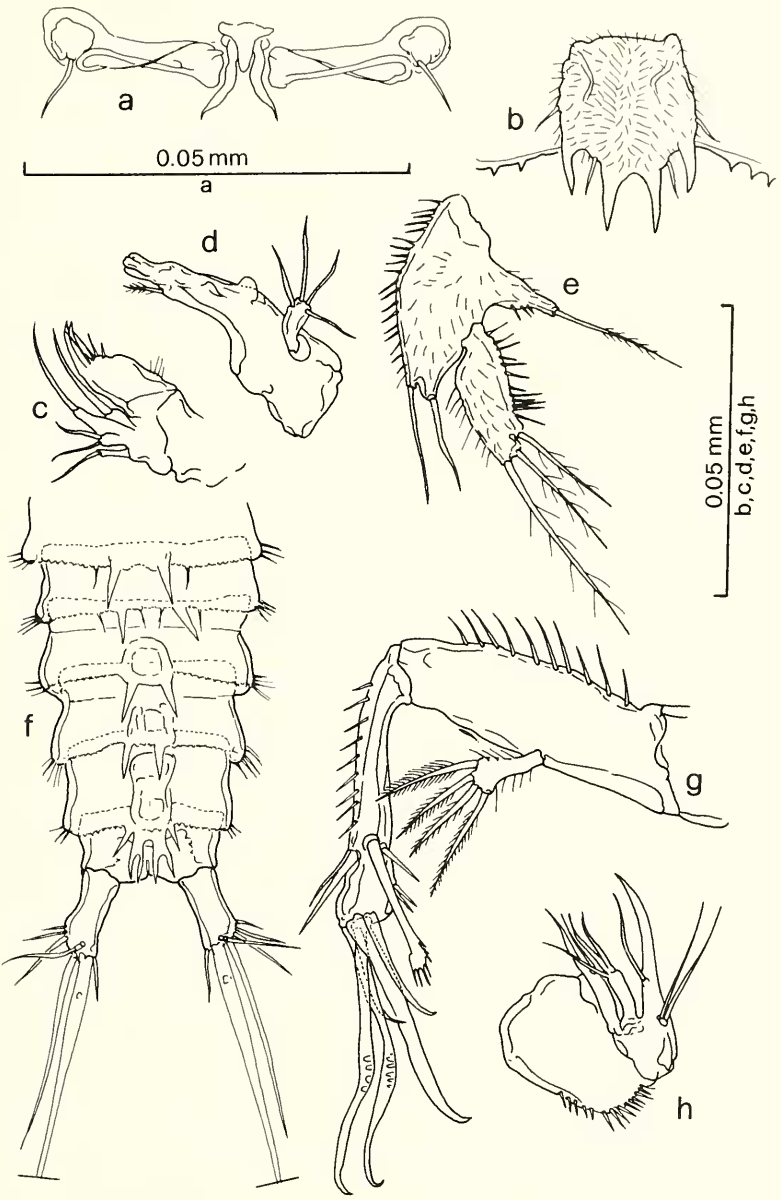


Fig. 3 - *E. minuta* n. sp.. Female holotype: Figs. a,b,c,d,e,g,h. Male paratype: Fig. f. a - genital field; b - dorsal process of cephalotorax; c - first maxilla; d - mandible; e - P5; f - abdominal somites and furcal rami; g - second antenna; h - second maxilla.

Remarks - According to LANG (1965), in the genus *Echinolaophonte* two evolutionary lines can be found out. In one line, the last segment of exopodite of P2-P4 respectively has 3,3,2 outer spines and, in the male, the endopodite of P3 is « tranformed » (i.e., it has three segments, the second one bearing a distal apophisis). In the other line, the same segments respectively carries 2,3,2 outer spines and, in the male, the endopodite of P3 is not « transformed » (two segments without apophisis, as in female).

Then, the new species (having 2,3,2 outer spines and « transformed » endopodite of P3, seems to show a feature of one line and a feature of the other line. A similar condition, but inverted, can be observed also in *E. tetracheir* Mielke, 1981. For a thorough discussion on the genus *Echinolaophonte* we refer to an our paper under preparation. We just would like to point out that, without considering the number of outer spines, the presence of the « transformed » endopodite of P3 (♂) brings *E. minuta* closer to the first evolutionary line suggested by Lang. The following species belong to this group: *E. horrida* (Norman, 1876), *E. brevispinosa* (Sars, 1908), *E. oshoroensis* Ito, 1969, *E. tropica* Ummerkutty 1970 (cfr. Wells, 1976). *E. minuta* differs from the aforesaid species in the number of outer spines, as well as in many other features such as: a particular morphology of the apophisis of median segment of endopodite P3 (♂), angled instead of straight; the morphology and ornamentation of rostrum and that of dorsal process of cephalotorax; the ornamentation of penultimate somite; the reduced chaetotaxie of P2-P4; the number of inner setae on baseoendopodite of P5 (♀) (two instead of four); the tendency, particularly emphatized in the female, to reduce the sizes of endopodite P2-P4.

Furthermore, there are two others *Echinolaophonte*, *E. mirabilis* (Gurney, 1927) and *E. gladiator* (Vervoort, 1964), only the female specimens of which are known. These can be easily distinguished by the number of outer spines on third segment of exopodite of P2-P4 (3,3,3 and 2,2,2 respectively) not only from the species here described, but also from those ones included in the aforesaid group. On the other hand, since the males are unknown, it is not possible to verify whether some affinities do occour as the endopodite P3 is concerned.

To sum up, *E. minuta* doesn't seem to show particular affinities with the other species of *Echinolaophonte* here discussed, while we can say that it is related to another *Echinolaophonte* sp. sampled in the

interstitial environment from the isle of Ischia (Neaples) and that is still under consideration.

From the ecological point of view, as already said, the new species is till now the only interstitial *Echinolaophonte* known from Mediterranean Sea. Apart this species, *E. tetracheir* Mielke, 1981, from Galapagos islands, is the only other *Echinolaophonte* known from the insterstitial environment.

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RIASSUNTO

Nella presente nota si segnala il ritrovamento di *Echinolaophonte armiger typica* Lang 1965, raccolta nel benthos litorale dell'isolotto di Spargi e dell'isolotto dei Cavoli e si descrive e discute *E. minuta* n. sp., la prima *Echinolaophonte* interstiziale nota per il Mediterraneo, raccolta in un arenile dell'isolotto di Li Nibani 2. La nuova specie è caratterizzata, in particolare, dalla combinazione dei seguenti caratteri: chetotassia

degli arti P2-P4, morfologia del rostro e del processo dorsale del cefalotorace, ornamentazione del baseoendopodite P5 (♀), e non sembra mostrare particolari affinità con le altre specie note di *Echinolaophonte*.

SUMMARY

This paper deals with two Harpacticoids of the genus *Echinolaophonte* collected in three circumsardinian islet: *E. armiger typica*, from litoral benthos of Spargi and dei Cavoli islets, and *E. minuta* n. sp. from a beach of Li Nibani 2 islet, the first interstitial *Echinolaophonte* known from the Mediterranean Sea. The new species is widely described and discussed; as for a particular arrangement of features, it doesn't seem to show great affinities with the other species of *Echinolaophonte* known.